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Titel des Beitrags: Turbulent transport of airborne pollutants in a residential room with a novel air conditioning unit

Abstract: Modeling on indoor air quality is performed considering the effect of a new window-type air conditioner, which is a promising way toward compromising energy consumption and residential air environment. Sensitivity analysis of the actual operating situations has been implemented, including the total fresh air supply and the full room air recirculation. The effects of supplying air flow rate, pollutant filtration efficiency, and indoor thermal buoyancy on the airborne pollutant transports are also illustrated. The numerical results demonstrate that the reduction of indoor pollutant levels can be accomplished either by increasing the fresh air ratio, or by increasing filtered removal efficiency, or by increasing the supplying airflow rate, or by decreasing the strength of indoor heating source. The indoor contaminant concentration asymptotically approaches to a small value for the situation of full fresh air supply, which agrees well with the analytical solutions of indoor contaminant concentration under the extreme operations.

Stichworte: Air conditioner; Heat recovery; Airborne pollutants; Asymptotical solutions

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